

# NEVADA DIVISION OF ENVIRONMENTAL PROTECTION

## FACT SHEET (Pursuant to NAC 445A.236) May, 2003

**PERMITTEE NAME:** Minden-Gardnerville Sanitation District

**PERMIT NUMBER:** NEV40027

**LOCATION:** Minden-Gardnerville Wastewater Treatment Facility  
U.S. Highway 395  
Minden, Douglas County, Nevada 89423

Latitude: 38°57'57" North  
Longitude: 119°47'52" West

**FLOW:** 3.1 Million Gallons per Day (mgd)

### **GENERAL:**

The Minden-Gardnerville Sanitation District (MGSD) is a 3.1 million-gallon per day (mgd) wastewater reclamation facility providing secondary wastewater treatment with disinfection in Douglas County, Nevada. Wastewater from residences and commercial or industrial facilities serviced in the Minden/Gardnerville area is treated to meet secondary treatment standards using primary clarification, attached-growth trickling filters, and secondary clarification with a contact stabilization polish before chlorine disinfection.

Because commercial and residential developments have sprawled into the immediate area surrounding MGSD, MGSD has been forced to expend considerable effort and resources on odor control. Currently, MGSD uses a chemical scrubber to treat odorous gases from the headworks and a biofiltration unit to treat odorous gases drawn from treatment equipment. In addition, MGSD plans to install diffusive aerators in the primary effluent vault to reduce aerosol odors prior to diversion through the trickling filters.

Treated effluent is either discharged for storage in two (2), clay-lined reservoirs (Outfall 001) or directly discharged for irrigation on approximately 28 acres owned and cultivated by MGSD (Outfall 002). The storage reservoirs have a cumulative holding capacity of 550 acre-feet and are located northwest of the treatment plant, across Muller Lane. Treated wastewater is discharged from the reservoirs on an as-needed basis for reuse irrigation on approximately 1,600 acres of property owned and cultivated for forage crops by Galeppi Land & Livestock and Park Cattle Company. Bently Agrowdynamics has also entered into agreement with MGSD to use treated effluent for crop irrigation, and upon completing construction of the necessary pipeline and infrastructure, is anticipated to expand the reuse (area by as much as 5,200 acres, and possibly more). Treated wastewater discharged for off-site reuse irrigation is regulated as Outfall 003.

Waste sludge is anaerobically processed in two (2) 250,000-gallon digesters to meet Class B biosolids reuse standards. Class A biosolids are no longer produced at MGSD, and all Class B biosolids are transported for land application.

Historically, MGSD has assumed responsibility for ensuring that off-site reuse irrigation and/or biosolids reuse practices are conducted in accordance with applicable regulations and standards. However, given projected expansion of the reuse programs and the associated difficulties of accurate monitoring and reporting, MGSD will no longer assume responsibility for off-site application practices.

The proposed permit renewal includes specific provisions to permit: (1) on-site reuse irrigation, (2) off-site distribution of reclaimed wastewater for irrigation, and (3) distribution of biosolids meeting Class B treatment standards for land application uses. Stipulations for MGSD to retain responsibility for off-site reuse irrigation

practices or for the compliance of "all users and disposers" of biosolids are omitted from Groundwater Discharge Permit NEV4002, and therefore, site-specific permits for either reuse irrigation or land application of biosolids must be applied for an obtained by those receiving and using these treated products.

#### **DISCHARGE CHARACTERISTICS**

The current permit limits discharge characteristics at the outfall of the chlorine contact tank (Outfall 001) for constituents including: 5-day carbonaceous biochemical oxygen demand (CBOD<sub>5</sub>), total suspended solids (TSS), and pH in accordance with State and federal requirements for secondary treatment standards as well as flow and fecal coliform. Reuse effluent discharged from the reservoir(s) is also monitored for constituent concentrations including: total nitrogen as nitrogen (as N), nitrate as N, total kjeldahl nitrogen as N (TKN as N), and ammonia as N. Discharge limitations for the reservoir(s) (Outfall 003) are included in accordance with reuse requirements defined in Nevada Administrative Code (NAC) 445A.275 through NAC 445A.280.

CBOD<sub>5</sub>, TSS, and pH parameters have all been within numeric discharge limitations, while total nitrogen concentrations at the reservoir(s) discharge range from approximately 10 to 34 milligrams per liter (mg/L). Total nitrogen concentrations quantified since May 2001 are predominantly ammonia, with only fractional concentrations of nitrate. Since the system is not or has not been denitrifying, the renewed permit requires quarterly nitrogen balance calculations to ensure that the mass of nitrogen applied to irrigation plots does not exceed the cumulative annual uptake of cultivated crops.

#### **RECEIVING WATER CHARACTERISTICS:**

Monitoring well data collected at six (6) monitoring wells (MW-2 through MW-7) associated with the facility and reuse site(s) indicates shallow groundwater at depths ranging from 2 to 10 feet below grade surface (bgs). Groundwater quality is generally fair, however, up gradient monitoring well locations have exhibited total dissolved solids (TDS) concentrations in excess of 500 milligrams per liter (mg/L), and in some instances, greater than 1000 mg/L.

Total nitrogen concentrations at most monitoring well locations fluctuate within a typical range of 0.5 and 8.5 mg/L and vary with respect to the proportional concentrations of organic versus inorganic nitrogen compounds. Elevated total nitrogen concentrations noted at monitoring well locations MW-4 and MW-5, which are configured within reuse areas to the north and west of the storage reservoirs, are predominantly composed of ammonia (e.g. 90-100%) rather than nitrate.

While ammonia and organic nitrogen concentrations dominate groundwater at monitoring well locations MW-4 and MW-5, nitrate is the predominant groundwater constituent at monitoring well locations MW-2 and MW-7. Monitoring well MW-2 is located adjacent to the east side of the effluent storage reservoir(s) and extends to a depth of approximately 10.5 feet below grade surface (bgs). Since February 2002, groundwater samples collected at this location have yielded rising nitrate concentrations, and in May 2002 a concentration of 31 mg/L was reported. Nitrate concentrations at monitoring well location MW-7 have also exhibited an erratically increasing trend, but concentrations typically range between 1 and 4 mg/L.

Speculative conclusions from field inspections conducted in September 2002 to determine possible causes and/or sources of nitrate in groundwater suggest that property leveling (laser-leveling) using organically enriched fill material and subsequent flood irrigation may have mobilized excess concentrations of organic nitrogen compounds into the relatively shallow saturated zone. In addition, there is also suspicion that the relatively shallow construction and lapsing age of the wells (15 to 20 years old) may be contributing to structural deterioration, in which case, groundwater samples may not be representative of actual aquifer characteristics.

In response to the varying conditions observed at monitoring well locations MW-2, 4, 5 and MW-7, MGSD has: (1) implemented a scheduled action plan, approved by the Division, to monitor and/or abate groundwater impacts, and (2) proposed to replace monitoring wells MW-2 through MW-7. Concurrent with replacement well installation activities, existing wells MW-2 through MW-7 will be properly abandoned.

While on-going monitoring activities are expected to confirm whether or not nitrogen concentrations (nitrate) equilibrate and subside in the shallow aquifer, which would be consistent with a causal event such as property leveling, the new wells are expected to improve sample representation by incorporating construction specifications suited to the variability of the hydrologic environment. The installation of new wells has been included as a Schedule of Compliance item in the renewed permit, and as subsequent data sets are collected and compiled for new well locations, appropriate long-term response actions and requirements will be re-evaluated.

The increasing trend of nitrogen concentrations at multiple groundwater monitoring locations necessitates a regimented examination of nitrogen loading to reuse irrigation sites. Unless and until nitrogen species in the effluent discharge are nitrified and denitrified, the renewed permit requires the calculation of an annual nitrogen budget as a compliance parameter with quarterly reconciliation and reporting of mass loading rates. A condition to update the Effluent Management Plan to include procedures for calculating nitrogen loading and reconcile an annual nitrogen mass balance is included in the Schedule of Compliance in the renewed permit. Nitrogen application will be limited to no more than 110% of the estimated uptake of nitrogen by irrigated crops. The renewed permit includes a condition to re-open, re-evaluate, and potentially modify effluent discharge limitations based on subsequent nitrogen balance calculations or other monitored results.

**PROPOSED LIMITATIONS:**

**Effluent Discharge Limitations:** During the period beginning on the effective date of this permit and lasting until the permit expires, the Permittee is authorized to discharge from:

- Outfall 001: To the storage reservoirs
- Outfall 002: To the MGSD irrigation fields
- Outfall 003: To off-site reuse irrigation locations (Galeppi, Park, and Bently)

Confirmation samples or discharge parameter measurements shall be collected at:

- Influent: At the intake of the Parshall flume for flow measurements and at the influent pump station wet well for laboratory samples
- Outfall 001: At the discharge from the chlorine contact tank
- Outfall 002: At the discharge of the chlorine contact tank prior to MGSD field application
- Outfall 003: At the discharge from the storage reservoir(s)

Flow measurements shall be recorded at the discharge of the Wastewater Reclamation Facility prior to conveyance to the storage reservoirs. The volume of treated effluent distributed to MGSD irrigation fields and/or permitted users shall also be metered and to confirm nitrogen loading rates and mass balance calculations.

The discharge shall be limited and monitored by the Permittee as specified below:

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### Effluent Reuse Limitations

PARAMETERS	MONITORING LOCATION	DISCHARGE LIMITATIONS			MONITORING REQUIREMENTS	
		30-Day Average	Daily Maximum	Monthly Total	Measurement Frequency	Sample Type
Influent Flow Rate (mgd)	Influent	2.8	3.1	----	Continuous	Flow Meter
MGSD Irrigation Volume (gallons)	Influent (for Outfall 002)	----	----	Monitor & Report	Monthly	Flow Meter
Off-site Irrigation Volume (gallons)	Outfall 003	----	----	Monitor & Report	Monthly	Surveyed Volume Measurements or Pump Timer
CBOD <sub>5</sub> (mg/L)	Influent	Monitor & Report			Weekly	Composite
CBOD <sub>5</sub> (mg/L)	Outfall 001	30	45	----	Weekly	Composite
CBOD <sub>5</sub> Treatment Efficiency	----	85%	----	----	Monthly	Calculation
Total Suspended Solids (mg/L)	Influent	Monitor & Report			Weekly	Composite
Total Suspended Solids (mg/L)	Outfall 001	30	45	----	Weekly	Composite
Total Suspended Solids Treatment Efficiency	----	85%	----	----	Monthly	Calculation
Fecal Coliform (CFU/mL)	Outfall 001	200/100	400/100	----	Weekly	Discrete
pH (SU)	Outfall 001	6.0 to 9.0			Weekly	Discrete
Priority Pollutants <sup>1</sup>	Outfall 001	Monitor & Report			Annually	Discrete
Total Nitrogen as N (mg/L)	Outfall 002	Monitor & Report			Monthly (during reuse)	Composite
Nitrate as N (mg/L)	Outfall 002	Monitor & Report			Monthly (during reuse)	Composite
Application Volume, Acre-Feet (AF)/acre	Outfall 002	Monitor & Report <sup>2</sup>			Monthly (during reuse)	Calculation
Actual Nitrogen Loading (lbs/acre/quarter)	Outfall 002	Monitor & Report <sup>3, 4</sup> (less than the Allowable Nitrogen Loading value)			Quarterly	Calculation
Cumulative Annual Nitrogen Loading to date (lbs/acre/year) <sup>5</sup>	Outfall 002	Monitor & Report <sup>3, 4</sup> (less than the Allowable Nitrogen Loading value)			Quarterly	Calculation
Allowable Nitrogen Loading (lbs/acre/year)	Outfall 002	Report <sup>6</sup>			Quarterly <sup>7</sup>	Calculated in the EMP

mgd: Million gallons per day  
 CFU/mL: Colony forming units per milliliter  
 CBOD<sub>5</sub>: 5-day carbonaceous biochemical oxygen demand  
 SU: Standard Units  
 mg/L: Milligrams per liter  
 as N: As nitrogen

lbs/year: Pounds per year  
EMP: Effluent Management Plan

*Footnotes:*

- 1: Priority Pollutants listed in Attachment A.
- 2: The annual application volume applied only to those fields managed by MGSD.
- 3: Acre-Feet (AF x 3.069 = Million Gallons). Volume determined for/from Consumptive Use Balance.
- 4: Mass determined in accordance with guidance document *WTS-1B: General Criteria for Preparing an Effluent Management Plan* for fields managed by MGSD.
- 5: The total annual nitrogen applied (lbs/acre/year) shall not be greater than 110% of the total annual nitrogen uptake (lbs/acre/year). Calculations and monitoring data (submitted quarterly) shall use the **total nitrogen** in the applied wastewater (monitored by the treatment facility), total nitrogen from fertilizer applications, nitrogen uptake by crops or vegetation, evapotranspiration rate, precipitation rate, and fraction of applied nitrogen removed by denitrification and volatilization. Quarterly calculations shall be used to reconcile available nitrogen balance, prorated based on the allocated limitation (lbs/acre/year) defined in the EMP, and an annual report shall be submitted for the fourth quarter of every year demonstrating compliance with the Annual Nitrogen Balance limitation.
- 6: For each reporting year.
- 7: Calculated in the required EMP for irrigation fields managed by MGSD and incorporated by reference as the effluent limitation for the allowable application of nitrogen mass in units of pounds per year per acre. The amount of nitrogen applied shall not exceed 110% of the amount of nitrogen consumed by irrigated crops.
- 8: The calculated Annual Nitrogen Loading value included in the EMP must be reported on each quarterly Discharge Monitoring Report.

**Rationale for Effluent Discharge Limitations:**

The rationale for the proposed monitoring conditions is as follows:

- *Flow:* 2.8/3.1 mgd - The treatment system is designed/rated for operation at a 30-day average of 2.8 mgd (HDR Engineering, Inc.), with a daily maximum capacity of 3.1 mgd.
- *MGSD Irrigation Volume:* Monitor and Report (gallons) on a monthly basis. This reporting requirement is included for the development and confirmation of calculations indicating the total mass of nitrogen applied to irrigation fields.
- *5-Day Carbonaceous Biochemical Oxygen Demand (CBOD<sub>5</sub>):* 30 mg/L (775 pounds per day [# /day]) 30-day average and 45 mg/L daily maximum (1,163 #/day). The 30-day average limitation is based on "secondary treatment standards" cited under Nevada Administrative Code (NAC) 445A.275. The daily maximum limitation of 45 mg/L has been preserved from the previous permit as an achievable level of treatment sufficiently protective of groundwater of the State. A minimum treatment efficiency of 85% is required between the influent and effluent concentration per NAC445A.275 and 40 CFR §133.102.
- *Total Suspended Solids (TSS):* 30 mg/L (775 #/day) 30-day average and 45 mg/L daily maximum (1,163 #/day). These limitations are based on secondary treatment standards required under 40 Code of Federal Regulations (CFR) §133.102. A minimum treatment efficiency of 85% is required between the influent and effluent concentration per NAC445A.275 and 40 CFR §133.102.
- *Fecal Coliform:* 200 colony forming units (cfu)/100 mL 30-day average and 400 cfu/100 mL daily maximum.

These limitations are required for flood or drip irrigation using treated effluent per NAC445A.278. MGSD uses flood irrigation on reuse crop fields.

- *pH*: 6.0-9.0 standard units. This limitation is based on reuse requirements and secondary treatment standards per NAC445A.275 and 40 CFR §133.102.
- *Priority Pollutants*: An annual monitoring requirement for priority pollutants has been added to routinely confirm the absence of industrial pollutants in the treated discharge and to provide sentinel data regarding potential constituents that may be present in biosolids that are not routinely quantified.
- *Total Nitrogen as Nitrogen*: Monitor and Report. This reporting requirement is included to account for the total mass of nitrogen applied to irrigation fields and to evaluate the potential for the combined forms of nitrogen to convert to nitrate in a shallow groundwater environment.
- *Nitrate as Nitrogen*: Monitor and Report. This reporting requirement is included to evaluate the proportional distribution of nitrogen compounds in the treated effluent discharge and to assess the potential for direct impact to the shallow aquifer environment.
- *Application Volume*: Monitor and Report. This reporting requirement is included to verify the total amount of treated effluent discharged for reuse on MGSD irrigation fields (derived from monthly monitoring data).
- *Actual Nitrogen Loading*: Monitor and Report. This reporting requirement is included to verify the total amount of nitrogen applied to MGSD irrigation fields (treated effluent, fertilizers, and other nitrogen bearing supplements, etc.), and shall be calculated quarterly in accordance with the procedures outlined in guidance document *WTS-1B: General Criteria for Preparing an Effluent Management Plan*.
- *Allowable Nitrogen Loading*: Monitor and Report. This requirement is required to verify and reconcile the adequate uptake of nitrogen by cultivated crops in comparison to the mass of nitrogen applied using treated effluent for irrigation, as well as, supplemental sources of applied nitrogen. The amount of nitrogen applied shall not exceed 110% of the amount of nitrogen used by irrigated crops. The calculated mass of *Allowable Nitrogen Loading* shall be recalculated, as needed, to accurately reflect the agricultural uses and cycles of irrigated fields.

#### **Groundwater Monitoring:**

Monitoring wells MW-2 through MW-7 (replacement wells MW-2 through MW-7), installed at locations around the storage reservoirs and in nearby irrigation fields, shall be sampled for the presence of nitrogen compounds, total dissolved solids (TDS), and chloride. Wells shall be monitored in accordance with permit conditions and defined sampling and analysis protocol included in the revised EMP, which must be approved by the Division. Should site investigation activities, long-term monitoring results, and/or remedial efforts necessitate or warrant the installation of additional monitoring wells, all additional wells shall be incorporated into the required monitoring schedule. All subsequent monitoring wells installed shall be constructed in accordance with "WTS-4: Monitoring Well Design Requirements"(NDEP, February 1997).

Groundwater wells shall be monitored according to the following parameters:

**Ground Water Monitoring Requirements**

PARAMETER	REQUIREMENTS	SAMPLE LOCATION	SAMPLE FREQUENCY	SAMPLE TYPE
Depth to Groundwater (feet)	Monitor & Report	MW-2 through MW-7 (and any others)	Quarterly	Field Measurement
Groundwater Elevation (feet above msl)	Monitor & Report	MW-2 through MW-7 (and any others)	Quarterly	Calculate
Nitrate as Nitrogen (N, mg/L)	10	MW-2 through MW-7 (and any others)	Quarterly	Discrete
Total Nitrogen as N (mg/L)	Monitor & Report	MW-2 through MW-7 (and any others)	Quarterly	Discrete
Chlorides (mg/L)	Monitor & Report	MW-2 through MW-7 (and any others)	Quarterly	Discrete
Total Dissolved Solids (TDS, mg/L)	Monitor & Report	MW-2 through MW-7 (and any others)	Quarterly	Discrete

msl: mean sea level (above)  
 mg/L: milligram per liter  
 as N: as Nitrogen

The detection of concentrations of nitrate as nitrogen (-N) in groundwater samples invoke, at a minimum, the following limitations and response requirements:

- i. If the nitrate-N concentrations increase to 7.0 milligrams per liter (mg/L), the Permittee shall notify the Division and submit a plan for the reduction of nitrogen in groundwater.
- ii. If the nitrate-N concentration in groundwater increases to 9.0 mg/L, the Permittee shall begin implementation of the plan for the reduction of nitrogen loading to groundwater.
- iii. If the nitrate-N concentration increases to 10.0 mg/L, the discharge to groundwater must cease.

**SCHEDULE OF COMPLIANCE:**

The Permittee shall implement and comply with the provisions of the permit upon issuance and the following schedule of compliance, after approval by the Administrator, including in said implementation and compliance, any additions or modifications the Administrator may make in approving the schedule of compliance.

- ⇒ **Upon issuance of the permit**, the Permittee shall achieve compliance with all discharge limitations;
- ⇒ **Within 45 days of the permit issue date (date)**, the Permittee shall submit a Well Installation Plan for Division approval that details proposed construction specifications, well location(s), and a schedule for the installation of replacement groundwater monitoring wells. All plans must be approved by the Division prior to the start of construction and must be stamped by a Professional Engineer registered in the State of Nevada.
- i. Within 45 days of well installation and development (date pending), the Permittee shall submit a Well Installation Report that includes information such as well locations (latitude and longitude coordinates), a scaled map illustrating each well location, well head elevations (as available), as-built construction specifications, boring logs, and copies of the Notice(s) of Intent, as well as any other

pertinent information or field observations.

⇒ **Within 90 days of the permit issue date (date)**, the Permittee shall submit an updated Operations and Maintenance (O&M) Manual prepared in accordance with guidance document *WTS-2: Minimum Information Required for an Operations and Maintenance Manual*. The updated O&M Manual must be stamped by a Professional Engineer licensed in the State of Nevada.

**Within 90 days of the permit issue date (date)**, the Permittee shall submit a revised Effluent Management Plan (EMP) prepared in accordance with guidance document *WTS-1B: General Criteria for Preparing an Effluent Management Plan*. The updated EMP must be stamped by a Professional Engineer licensed in the State of Nevada, and shall also include:

- i. A section detailing a sampling and analysis program for groundwater monitoring activities
- ii. A copy of the document prepared notifying affected facility personnel of the possible hazards and proper hygiene of working with and around reclaimed water.
- iii. Documentation that notification has been made to the local water purveyor and the local health agency of the use of reclaimed water at the subject facility. The document shall describe the plan for complying with the cross-connection control requirements of the local water purveyor.

#### **TREATED EFFLUENT REUSE SITES**

The following is a current list of agricultural users receiving treated effluent supplied by the Minden-Gardnerville Sanitation District for irrigation. Each user is required to apply for and obtain a Groundwater Discharge permit for the use and application of treated effluent.

- ⇒ Park Cattle Company
- ⇒ Galeppi Land and Livestock
- ⇒ Bently Agrowdynamics

#### **PROPOSED DETERMINATION:**

The Division has made the tentative determination to issue (renew) the proposed permit for a 5-year period.

#### **PROCEDURES FOR PUBLIC COMMENT:**

Notice of the Division's intent to issue a permit authorizing the facility to discharge to ground water of the State of Nevada, subject to the conditions contained within the permit, is being sent to **The Record Courier** (Douglas County legal notices) for publication. Notice is also mailed to interested persons on our mailing list. Anyone wishing to comment on the proposed permit can do so in writing for a period of 30 days following the date of the public notice, and must be postmarked, faxed, or E-mailed by 5:00 p.m. on **June 24, 2003**. The comment period can be extended at the discretion of the Administrator. A public hearing on the proposed determination can be requested by the applicant, any affected State, any affected interstate agency, the Regional Administrator, or any interested agency, person, or group of persons. The request must be filed within the comment period and must indicate the interest of the person filing the request and the reason(s) why a hearing is warranted.

Any public hearing determined by the Administrator to will be conducted in the geographical area of the proposed discharge or any other area the Administrator determined to be appropriate. All public hearings will be conducted in accordance with NAC 445A.238. The final determination of the Administrator may be appealed to the State Environmental Commission pursuant to NRS 445A.605.

Prepared by:

Tamara J. Pelham

January 16, 2003, February 28, 2003, March 26, 2003, April 28, 2003, May 20, 2003

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